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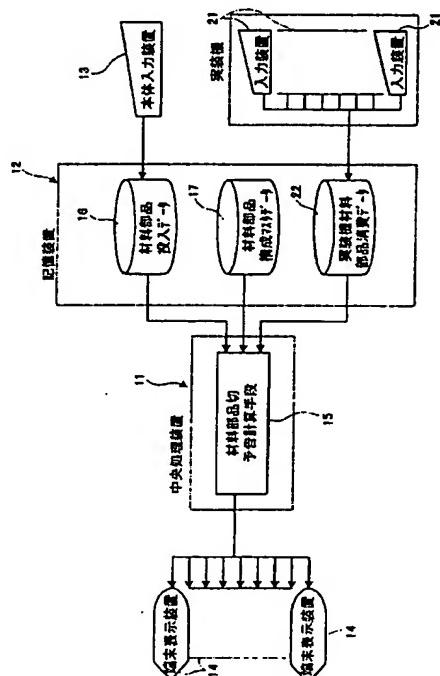
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(54) 【発明の名称】 実装工程における材料部品供給支援方法および装置

(57) 【要約】

【課題】 オペレータの作業効率の向上を図る。

【解決手段】 実装工程で実装機オペレータに材料部品の補充交換時期を連絡するに際して、実装機への装着軸別の材料部品投入データ16、および製品を構成する部品種類および数量を記録した材料部品構成マスタデータ17、ならびに実装機における材料部品消費データ22に基づいて、材料部品切れ予告時間計算手段15により材料部品投入開始時刻より該当材料部品がすべて消費されるまでの材料部品切時刻を算出し、この材料部品切時刻を含む材料部品切予告情報を実装機オペレータが所持する端末表示器14に表示する。



## 【特許請求の範囲】

【請求項1】実装工程で実装機オペレータに材料部品の補充交換時期を連絡するに際して、実装機への装着軸別の材料部品投入データ、および製品を構成する材料部品種類および数量を記録した材料部品構成マスタデータ、ならびに実装機における材料部品消費データに基づいて、材料投入開始時刻よりこれらの材料部品が消費されるまでの材料部品切時刻を算出し、この材料部品切時刻を含む材料部品切予告情報を実装機オペレータに告知することを特徴とする実装工程における材料部品供給支援方法。

【請求項2】材料部品切予告情報の告知は、材料部品切予告情報に優先順位を付けて表示装置に表示することを特徴とする請求項1記載の実装工程における材料部品供給支援方法。

【請求項3】材料部品切予告情報の告知を、実装機オペレータが所持する携帯端末機器の表示手段に表示することを特徴とする請求項1または2記載の実装工程における材料部品供給支援方法。

【請求項4】実装工程で、材料部品切れする材料部品の供給を材料供給元に要求するに際し、実装機への装着軸別の材料部品投入データ、製品を構成する材料部品種類および数量を記録した材料部品構成マスタデータ、実装機における材料部品消費データおよび材料部品在庫データに基づいて、材料投入開始時刻よりこれらの材料が消費されるまでの材料部品切時刻を算出し、所定のタイミングで必要な材料部品を出庫要求することを特徴とする実装工程における材料部品供給支援方法。

【請求項5】実装工程で実装機オペレータに材料部品の補充交換時期を告知する実装工程における材料部品供給支援装置であって、

実装機への装着軸別材料部品供給データおよび製品を構成する材料部品種類および数量を記録した材料部品構成マスタデータならびに実装機における材料部品消費データを入力する入力手段と、

前記材料部品供給数データおよび材料部品構成マスタデータならびに材料部品消費データを記憶する記憶装置と、

前記材料部品供給数データおよび材料部品構成マスタデータならびに材料部品消費データに基づいて材料投入開始時刻よりこれらの材料が消費されるまでの材料部品切時刻を算出する材料部品切予告計算手段を有する中央処理装置とを具備し、

材料部品切時刻を含む材料部品切予告情報を表示する表示手段を、実装機オペレーターの所持する端末機器に設けたことを特徴とする実装工程における材料部品供給支援装置。

【請求項6】実装工程で、材料部品切れする材料部品の供給を材料供給元に要求する実装工程における材料部品

供給支援装置であって、

装着軸別の材料部品供給数データ、材料部品構成マスタデータ、実装機における材料部品消費データおよび材料部品在庫データを入力する入力手段と、

前記材料部品供給数データ、材料部品構成マスタデータ、材料部品消費データおよび材料部品在庫データを記憶する記憶装置と、

前記材料部品供給数データ、材料部品構成マスタデータ、材料部品消費データおよび材料部品在庫データに基づいて、材料投入開始時刻よりこれらの材料部品が消費されるまでの材料部品切時刻を算出する材料部品切予告計算手段を有する中央処理装置とを具備し、

前記中央処理手段に、材料部品切時刻に基づいて所定のタイミングで必要な材料部品を材料供給元に出庫要求する材料部品要求信号出力手段を設けたことを特徴とする実装工程における材料部品供給支援装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、製造業における実装工程において、生産に必要な材料部品、材料の交換や補充のタイミングを事前に予告したり、または材料部品切する材料部品や材料を供給元に要求することにより、オペレータの作業効率を向上させるための実装工程における材料部品供給支援方法および装置に関するものである。

【0002】

【従来の技術】近年、製造業の各生産工程においては、24時間の高効率稼動で生産する必要性がより一層高くなっている。なかでも源泉工程である実装工程ではオペレータが材料部品切れによる材料部品補給の為の設備停止時間を削減するために常時監視体制をしいていた。

【0003】従来の材料部品切予告装置は、図3に示すように、実装機への材料部品の初期投入数のデータは、本体入力装置3から一旦記憶装置2に入力されて、投入数を装着軸（Z軸という）別に登録した材料部品投入データ6として記憶され、また製品を構成する材料部品種類および数量のデータも、本体入力装置3から記憶装置2に入力されて材料部品構成マスタデータ7として記憶される。また、中央処理装置1では、材料部品投入データ6および材料部品構成マスタデータ7に基づいて材料部品切予告時間を算出する材料部品切予告計算手段5が設けられており、この材料部品切予告時間の情報は、表示装置4に表示される。

【0004】また実装工程では、材料部品不足の為の設備停止時間を削減と材料部品不足の発生を無くす為に、生産計画台数に基づいて必要材料部品の数量を算出し、生産に必要な材料数と安全を見越しての安全材料数（材料不足を回避する為の過剰材料）の分の材料を供給しており、実装工程現場に必要十分な材料部品を保管できるストック用の場所を準備する必要があった。

【0005】また上記の従来技術には、材料部品切れが発生しそうな材料部品に対して、事前に材料部品倉庫に材料の供給を要求する為のシステムが無かった。

【0006】

【発明が解決しようとする課題】しかしながら上記の材料部品切予告計算手段5は、実装機への材料部品の初期投入日時に、投入数量および材料部品構成データ内の員数より材料部品切予告時間を当初に1度計算した後は、その結果を表示装置4に表示するだけであり、生産の遅れ・進みにより実装機における各材料部品の消費量や消費時間は考慮されていなかった。

【0007】このため、実際には、当初に計算された材料部品切予告時間と、実際の材料部品の材料部品切れの発生する時間とは、誤差があり、実際の運用ではあくまでも目安程度にしか用いられていなかった。

【0008】また、実装機1台ごとの材料部品切予告時間は計算されていたが、複数の実装機からなる実装機ラインと言う観点から見た場合、どの実装機から順番に材料部品切が発生するのは即座にはわからず、オペレータが実装機別の材料部品切予告時間の情報をもとに判断しており、オペレータの作業負担となっていた。

【0009】更に、材料部品切予告の結果を表示する表示装置4は、中央処理装置1に接続された1台のCRTなどに限られて中央処理装置1に近い場所に設置されるため、情報を必要とするオペレータは、CRTの設置場所まで行かなければ情報を入手することができず、作業効率の低下を招いていた。

【0010】本発明は上記従来の問題点を解決するもので、生産の遅れや進みを材料部品切予告時間に反映させた正確な材料部品切予告情報をリアルタイムでオペレータに提供でき、オペレータの作業効率の向上を図ることができる実装工程における材料部品供給支援方法および装置を提供することを目的とする。

【0011】また正確な材料部品出庫の要求を行うことができて、材料部品不足を防ぐと共に材料部品在庫量を抑制することができる実装工程における材料部品供給支援方法および装置を提供することを目的とする。

【0012】

【課題を解決するための手段】この目的を達成するために請求項1記載の発明は、実装工程で実装機オペレータに材料部品の補充交換時期を連絡するに際して、実装機への装着軸別の材料部品投入データ、および製品を構成する材料部品種類および数量を記録した材料部品構成マスタデータ、ならびに実装機における材料部品消費データに基づいて、材料投入開始時刻よりこれらの材料部品が消費されるまでの材料部品切時刻を算出し、この材料部品切時刻を含む材料部品切予告情報を実装機オペレータに告知するものである。

【0013】上記構成によれば、材料部品投入データと材料部品構成マスタデータと材料部品消費データから、

現時点から何分後に材料部品切れが発生するのかという材料部品切時刻を計算し、この材料部品切時刻を含む材料部品切予告情報が表示装置に送られて表示される。この材料部品消費データは、実装機の最新の情報が取得されて用いられ、また材料部品切予告時間計算手段は、材料部品投入データに含まれる投入量と、材料部品構成マスタデータに含まれる材料部品構成の員数と、実装機からの材料消費量を乗じ、また実装機の生産工程を加味して、現時点からの乙軸別の材料部品切時間を算出するので、生産の遅れや進みを材料部品切予告時間に反映させた正確な材料部品切予告情報をリアルタイムでオペレータに提供することができ、オペレータの作業効率の向上を図ることができる。

【0014】また請求項5記載の発明は、実装工程で実装機オペレータに材料部品の補充交換時期を告知する実装工程における材料部品供給支援装置であって、実装機への装着軸別材料部品供給データおよび製品を構成する材料部品種類および数量を記録した材料部品構成マスタデータならびに実装機における材料部品消費データを入力する入力手段と、前記材料部品供給数データおよび材料部品構成マスタデータならびに材料部品消費データを記憶する記憶装置と、前記材料部品供給数データおよび材料部品構成マスタデータならびに材料部品消費データに基づいて材料投入開始時刻よりこれらの材料が消費されるまでの材料部品切時刻を算出する材料部品切予告計算手段を有する中央処理装置とを具備し、材料部品切時刻に基づく材料部品切予告情報を表示する表示手段を、実装機オペレーターの所持する端末機器に設けたものである。

【0015】上記構成によれば、材料部品投入データと材料部品構成マスタデータと材料部品消費データから、中央処理装置の材料部品切予告計算手段により、現時点から何分後に材料部品切れが発生するのかという材料部品切時刻が計算され、材料部品切時刻に基づく材料部品切予告情報が、オペレーターが所持する端末機器の表示手段に表示される。ここで実装機内の装着軸別の材料部品の材料部品消費データは、最新の情報を実装機入力手段から中央処理装置に取得して用いられており、また材料部品切予告時間計算手段では、材料部品投入データに含まれる投入量と材料部品構成マスタデータに含まれる材料部品構成の員数と実装機からの材料消費量を乗じ、実装機の生産工程を加味して、現時点からの装着軸別の材料部品切時間を算出するので、生産の遅れや進みを材料部品切予告時間に反映させた正確な材料部品切予告情報をリアルタイムでオペレーターに提供でき、オペレータの作業効率の向上を図ることができる。また、オペレーターは従来のように表示装置まで出向かなくても、手元の端末機器の表示手段により、リアルタイムで正確な材料部品切予告情報を入手することができ、作業効率をより向上させることができる。この最新の材料部品切予告時

間の提供によりオペレータは、設備の常時監視より開放され、付帯業務である稼動日報の集計作業等々に従事することができ、オペレータの作業負担の軽減と作業効率の向上が図れる。

【0016】請求項2記載の発明は、請求項1記載の方法において、材料部品切予告情報の告知は、材料部品切予告情報に優先順位を付けて表示装置に表示するものである。

【0017】上記構成によれば、作業が優先される優先順位、たとえば材料部品切が発生する順番が表示装置に表示されることにより、オペレータは、この材料部品切予告情報から即座に作業の必要な実装機や材料部品を判断することができ、最新の材料部品切予告時間に応じて、オペレータは事前の材料準備・調達が行え、材料部品切れ・材料補給による設備停止時間の削減がかかるので、オペレータの作業負担を軽減することができて作業効率の向上を図ることができる。

【0018】請求項3記載の発明は、請求項1または2のいずれかに記載の方法において、材料部品切予告情報の告知を、実装機オペレータが所持する携帯端末機器の表示手段に表示するものである。

【0019】上記構成によれば、オペレータは從来のように表示装置まで出向かなくても、手元の形態端末機器の表示装置により、リアルタイムで正確な材料部品切予告情報を入手することができ、作業効率をより向上させることができる。この最新の材料部品切予告時間の提供によりオペレータは、設備の常時監視より開放され、付帯業務である稼動日報の集計作業等々に従事することができ、オペレータの作業負担の軽減と作業効率の向上が図れる。

【0020】請求項4記載の発明は、実装工程で、材料部品切れする材料部品の供給を材料供給元に要求するに際し、実装機への装着軸別の材料部品投入データ、製品を構成する材料部品種類および数量を記録した材料部品構成マスタデータ、実装機における材料部品消費データおよび材料部品在庫データに基づいて、材料投入開始時刻よりこれらの材料が消費されるまでの材料部品切時刻を算出し、所定のタイミングで必要な材料部品を出庫要求するものである。

【0021】上記構成によれば、材料部品投入データ、材料部品構成マスタデータ、材料部品在庫データおよび実装機の装着軸別の材料部品消費データより現時点から何分後に材料部品切れが発生するのかが計算され、材料部品供給元に材料部品の供給を要求を指示する。実装機の装着軸別の材料部品消費データは、最新情報を実装機より取得し用い、また材料部品切予告時間計算では、材料部品投入データから実装機の生産工程を加味して、現時点からの装着軸別の材料部品切時時間を算出するので、最新の材料部品切予告情報に応じて、材料部品が材料部品供給元から材料部品切前に供給することができ、材料

部品不足の発生は起こらない。また実装工程への初期材料供給は、生産台数に必要な最低限の材料部品数のみの供給で良うことができ、過剰な材料部品の在庫を削減することができ、コストダウンが実現できる。

【0022】請求項6記載の発明は、実装工程で、材料部品切れする材料部品の供給を材料供給元に要求する実装工程における材料部品供給支援装置であって、装着軸別の材料部品供給数データ、材料部品構成マスタデータ、実装機における材料部品消費データおよび材料部品在庫データを入力する入力手段と、前記材料部品供給数データ、材料部品構成マスタデータ、材料部品消費データおよび材料部品在庫データを記憶する記憶装置と、前記材料部品供給数データ、材料部品構成マスタデータ、材料部品消費データおよび材料部品在庫データに基づいて、材料投入開始時刻よりこれらの材料部品が消費されるまでの材料部品切時刻を算出する材料部品切予告計算手段を有する中央処理装置とを具備し、前記中央処理手段に、材料部品切時刻に基づいて所定のタイミングで必要な材料部品を材料供給元に出庫要求する材料部品要求信号出力手段を設けたものである。

【0023】上記構成によれば、入力手段から入力された材料部品投入データ、材料部品構成マスタデータおよび材料部品在庫データと、材料部品消費データに基づいて、中央処理装置の材料部品切予告計算手段により、現時点から何分後に材料部品切れが発生するかの材料部品切時刻が計算され、この材料部品切時刻に基づいて、材料部品要求信号出力手段から材料部品供給元に必要材料部品の要求信号を出力して材料部品入庫を指示するので、最新の材料部品切予告時間に応じて、材料部品切れまでに正確な種類、数量の材料部品が材料供給元から入庫される為、材料部品不足の発生による生産停止は起こらない。また実装工程への初期材料供給は、生産台数に必要な最低限の材料部品数のみ良い為、過剰在庫の削減が図れコストダウンが実現できる。

【0024】  
【実施の形態】以下本発明に係る材料部品供給支援装置である材料部品切予告装置の実施の形態を図1を参照して説明する。

【0025】この材料部品切予告装置は、実装機への材料部品の投入情報を入力するための本体入力装置（入力手段）13と、実装機から材料部品の消費量情報を入力するための実装機入力装置（入力手段）21と、材料部品投入データ16、材料部品構成マスタデータ17、実装機材料部品消費量データ22を記憶するための記憶装置12と、前記各データから材料部品切予告時刻を算出する材料部品切予告時間計算手段15を有する中央処理装置11と、実装機のオペレータが所持する携帯端末機器に設けられて材料部品切予告時刻を含む材料部品切予告データを表示する端末表示装置（表示手段）14とを具備している。

【0026】上記材料部品切予告装置の動作を説明する。まず、実装機への材料部品の投入情報が本体入力装置13から、材料部品に添付の材料情報ラベルに表示されたデータに基づく材料部品投入データ16が記憶装置12に入力され登録される。この材料部品添付の材料情報ラベルの情報は、ラベル記載のバーコードをチェックすることで情報の入手を行うもので、この材料部品投入データ16には、材料部品投入日時、予告計算に必要な製品品番情報、投入先設備、Z軸（装着軸）No.、投入数量、数量などが含まれている。

【0027】また実装機入力装置21から最新の材料部品消費量が記憶装置12に入力されて実装機材料部品消費データ22として登録される。そして材料部品切予告計算手段5では、材料部品投入データ16と材料部品構成マスタデータ17と実装機材料部品消費データ22とに基づいて、材料部品切予告時刻が算出される。そして、この材料部品切予告時刻を含む材料部品切予告情報は実装機オペレータが所持する携帯端末機器に出力されたその端末表示装置14に表示される。

【0028】材料部品切予告計算手段15では、まず材料部品投入データ6に含まれるZ軸別の材料部品投入量と、材料部品構成マスタデータ17に含まれる材料部品構成の員数と、実装機材料部品消費データを乗じ、次いで実装機の生産工程（生産タクト）を加味し、これにより現時点からすべての実装機におけるZ軸別の材料部品切予告時刻を算出する。そして各実装機のZ軸別の材料部品切予告時刻を含む材料部品切予告データは、オペレータが材料部品補充作業に必要な優先順位、たとえば単純に材料部品切予告時刻順に並びかえることで、オペレータが一見してどの実装機のどのZ軸から順番に材料部品切れが発生するのかを瞬時判断できるように加工され、オペレータの携帯端末機器に直接出力して材料部品切予告情報を端末表示装置14に表示する。

【0029】上記実施の形態によれば、各実装機の最新の材料部品消費量をリアルタイムで実装機入力装置21から記憶装置12に出力して実装機材料部品消費データ22として記憶させ、本体入力装置12から入力された材料部品投入データ16と、予め記憶された材料部品構成マスタデータ17と共に、材料部品切予告計算手段15で演算処理されて材料部品切予告時刻が算出されるので、現時点からのZ軸別の材料部品切情報を端末表示装置14にリアルタイムで表示することができ、生産の遅れや進みを材料部品切予告時間に反映させた正確な材料部品切予告情報をオペレータに提供できて、オペレータの作業効率の向上を図ることができる。

【0030】また、材料部品切予告情報は、材料部品切となる時刻順の優先順位に沿って、どの実装機のどのZ軸の材料部品がなくなるのかが端末表示装置14に表示されるので、オペレーターは、この材料部品切予告情報から即座に材料部品補充の必要な材料部品や部品材料切と

なる実装機やZ軸を判断することができる。したがって、最新の材料部品切予告情報に応じて、オペレータは事前の材料準備・調達が行え、材料部品切れ・材料補給による設備停止時間の削減がはかれ、オペレータの作業負担を軽減することができて作業効率の向上を図ることができる。

【0031】さらに材料部品切予告情報が、実装機オペレータの所持する携帯端末機器の端末表示装置14に表示されるので、オペレータは従来のように表示装置まで出向かなくても、手元の形態端末機器で、リアルタイムで正確な材料部品切予告情報を入手することができ、作業効率をより向上させることができる。この最新の材料部品切予告時間の提供によりオペレータは、設備の常時監視より開放され、付帯業務である稼動日報の集計作業等々に従事することができ、オペレータの作業負担の軽減と作業効率の向上を図ることができる。

【0032】次に本発明に係る材料部品供給支援装置である材料供給要求装置の実施の形態を図2を参照して説明する。なお、材料切予告装置と同一部材には同一符号を付して説明を省略する。

【0033】記憶装置12には、材料部品投入データ16と材料部品構成マスタデータ17と実装機材料部品消費データ22のほかに、実装機ラインの材料部品保管部に保管された各材料部品の保管量を示す材料部品在庫データ31が記憶されており、この材料部品在庫データ31は本体入力装置12または他の入力装置から入力される。

【0034】また中央処理装置11には、材料部品切予告計算手段15で計算された材料部品切予告時刻に基づいて、材料要求信号を出力するが設けられており、設定された所定時間前になると、材料部品要求手段34から材料部品供給元である材料部品倉庫32の情報機器に材料部品切れする材料部品の種類や数量を要求する材料要求信号が出力され、材料部品倉庫32の倉庫表示装置（表示手段）33に材料部品要求情報が表示される。

【0035】上記材料部品切予告装置において、まず実装機への材料部品の投入情報が、入力装置3から材料部品添付の材料情報ラベルに基づいて入力され、記憶装置12に材料部品投入データ16として登録される。またこの時、記録装置12では、材料部品構成マスタデータ17が予め入力されているとともに、この実装機ラインの材料部品保管部に保管された各材料部品の保管量を示す材料部品在庫データ31が入力されて保管されている。さらに実装機入力装置21から記憶装置12に最新的の材料部品消費量情報が入力され実装機材料部品消費データ22として登録されている。

【0036】次いで、中央処理装置11の材料部品切予告計算手段15により、材料部品投入データ16と材料部品構成マスタデータ17、材料部品在庫データ31、実装機材料部品消費データ21に基づいて材料部品切予

告時刻が算出される。そして、所定時刻になると、材料部品要求手段34から材料部品倉庫32の情報機器に材料要求信号が出力され、材料部品倉庫32の表示装置33に、必要な材料部品の材料部品要求情報が表示される。これにより、最適なタイミングで材料部品倉庫32から目的の材料部品が実装機ラインに搬入される。

【0037】上記実施の形態によれば、本体入力装置12から入力された材料部品投入データ16、材料部品構成マスタデータ17に加えて材料部品在庫データ31と、実装機入力装置からリアルタイムで入力された実装機での装着軸別の材料部品消費データ31とより、中央処理装置11の材料部品切予告計算手段15で、現時点から何分後に材料部品切れが発生するかの材料部品切時刻が計算され、この材料部品切時刻に基づいて、材料部品要求信号出力手段から材料部品倉庫32に材料部品要求信号を出力するので、最新の材料部品切予告時間前野適正なタイミングで、必要とする材料部品の正確な種類や数量の材料部品が材料部品倉庫32から実装機ラインに入庫される為、材料部品不足の発生による生産停止は起こらない。また実装工程への初期材料部品供給は、生産台数に必要な最低限の材料部品数のみ良く、途中で追加される材料部品数も生産速度に応じた最適の数量が搬入される為、過剰在庫の削減が図れコストダウンが実現できる。

#### 【0038】

【発明の効果】以上のように請求項1記載の本発明によれば、材料部品投入データと材料部品構成マスタデータと材料部品消費データから、現時点から何分後に材料部品切れが発生するのかという材料部品切時刻を計算し、この材料部品切時刻を含む材料部品切予告情報が表示装置に送られて表示される。この材料部品消費データは、実装機の最新の情報が取得されて用いられ、また材料部品切予告時間計算手段は、材料部品投入データに含まれる投入量と、材料部品構成マスタデータに含まれる材料部品構成の員数と、実装機からの材料消費量を乗じ、また実装機の生産工程を加味して、現時点からのZ軸別の材料部品切時時間を算出するので、生産の遅れや進みを材料部品切予告時間に反映させた正確な材料部品切予告情報をリアルタイムでオペレータに提供することができ、オペレータの作業効率の向上を図ることができる。

【0039】また請求項5記載の発明によれば、材料部品投入データと材料部品構成マスタデータと材料部品消費データから、中央処理装置の材料部品切予告計算手段により、現時点から何分後に材料部品切れが発生するのかという材料部品切時刻が計算され、材料部品切時刻に基づく材料部品切予告情報が、オペレーターが所持する端末機器の表示手段に表示される。ここで実装機内の装着軸別の材料部品の材料部品消費データは、最新の情報を実装機入力手段から中央処理装置に取得して用いられており、また材料部品切予告時間計算手段では、材料部

品投入データに含まれる投入量と材料部品構成マスタデータに含まれる材料部品構成の員数と実装機からの材料消費量を乗じ、実装機の生産工程を加味して、現時点からの装着軸別の材料部品切時時間を算出するので、生産の遅れや進みを材料部品切予告時間に反映させた正確な材料部品切予告情報をリアルタイムでオペレータに提供でき、オペレータの作業効率の向上を図ることができる。また、オペレータは従来のように表示装置まで出向かなくても、手元の端末機器の表示手段により、リアルタイムで正確な材料部品切予告情報を入手することができ、作業効率をより向上させることができる。この最新の材料部品切予告時間の提供によりオペレータは、設備の常時監視より開放され、付帯業務である稼動日報の集計作業等々に従事することができ、オペレータの作業負担の軽減と作業効率の向上が図れる。

【0040】請求項2記載の発明によれば、作業が優先される優先順位、たとえば材料部品切れが発生する順番が表示装置に表示されることにより、オペレータは、この材料部品切予告情報から即座に作業の必要な実装機や材料部品を判断することができ、最新の材料部品切予告時間に応じて、オペレータは事前の材料準備・調達が行え、材料部品切れ・材料補給による設備停止時間の削減がはかれるので、オペレータの作業負担を軽減することができ作業効率の向上を図ることができる。

【0041】請求項3記載の発明によれば、オペレータは従来のように表示装置まで出向かなくても、手元の形態端末機器の表示装置により、リアルタイムで正確な材料部品切予告情報を入手することができ、作業効率をより向上させることができる。この最新の材料部品切予告時間の提供によりオペレータは、設備の常時監視より開放され、付帯業務である稼動日報の集計作業等々に従事することができ、オペレータの作業負担の軽減と作業効率の向上が図れる。

【0042】請求項4記載の発明によれば、材料部品投入データ、材料部品構成マスタデータ、材料部品在庫データおよび実装機の装着軸別の材料部品消費データより現時点から何分後に材料部品切れが発生するのかが計算され、材料部品供給元に材料部品の供給を要求を指示する。実装機の装着軸別の材料部品消費データは、最新情報を実装機より取得し用い、また材料部品切予告時間計算では、材料部品投入データから実装機の生産工程を加味して、現時点からの装着軸別の材料部品切時時間を算出するので、最新の材料部品切予告情報に応じて、材料部品が材料部品供給元から材料部品切前に供給することができ、材料部品不足の発生は起こらない。また実装工程への初期材料供給は、生産台数に必要な最低限の材料部品数のみの供給で良うことができ、過剰な材料部品の在庫を削減することができ、コストダウンが実現できる。

【0043】請求項6記載の発明によれば、入力手段から入力された材料部品投入データ、材料部品構成マスタ

データおよび材料部品在庫データと、材料部品消費データに基づいて、中央処理装置の材料部品切予告計算手段により、現時点から何分後に材料部品切れが発生するかの材料部品切時刻が計算され、この材料部品切時刻に基づいて、材料部品要求信号出力手段から材料部品供給元に必要材料部品の要求信号を出力して材料部品入庫を指示するので、最新の材料部品切予告時間に応じて、材料部品切れまでに正確な種類、数量の材料部品が材料供給元から入庫される為、材料部品不足の発生による生産停止は起こらない。また実装工程への初期材料供給は、生産台数に必要な最低限の材料部品数のみ良い為、過剰在庫の削減が図れコストダウンが実現できる。

【図面の簡単な説明】

【図1】本発明に係る材料部品切予告装置の実施の形態を示す構成図である。

【図2】本発明に係る材料部品要求装置の実施の形態を示す構成図である。

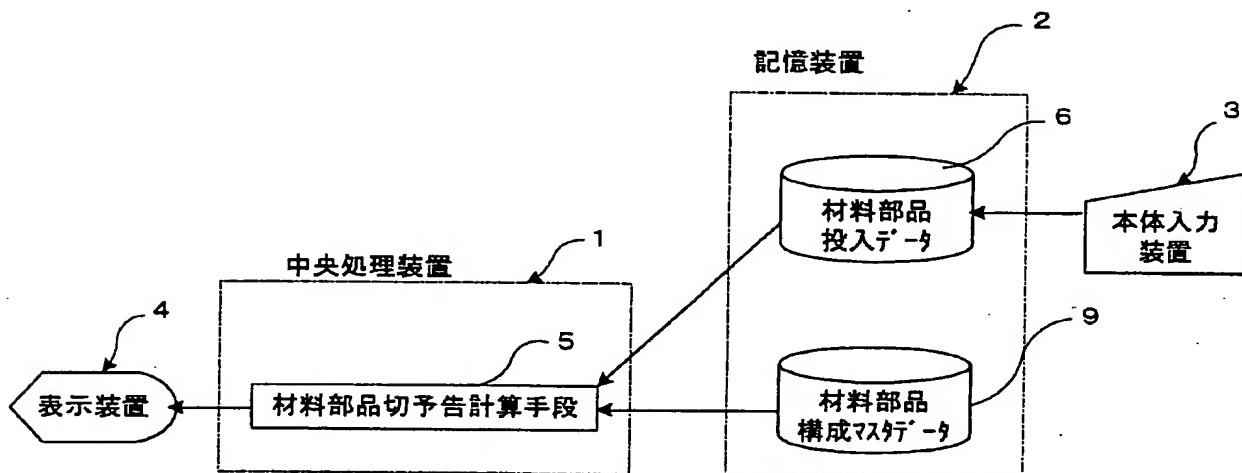
【図3】従来の材料部品切予告装置を示す構成図である。

【符号の説明】

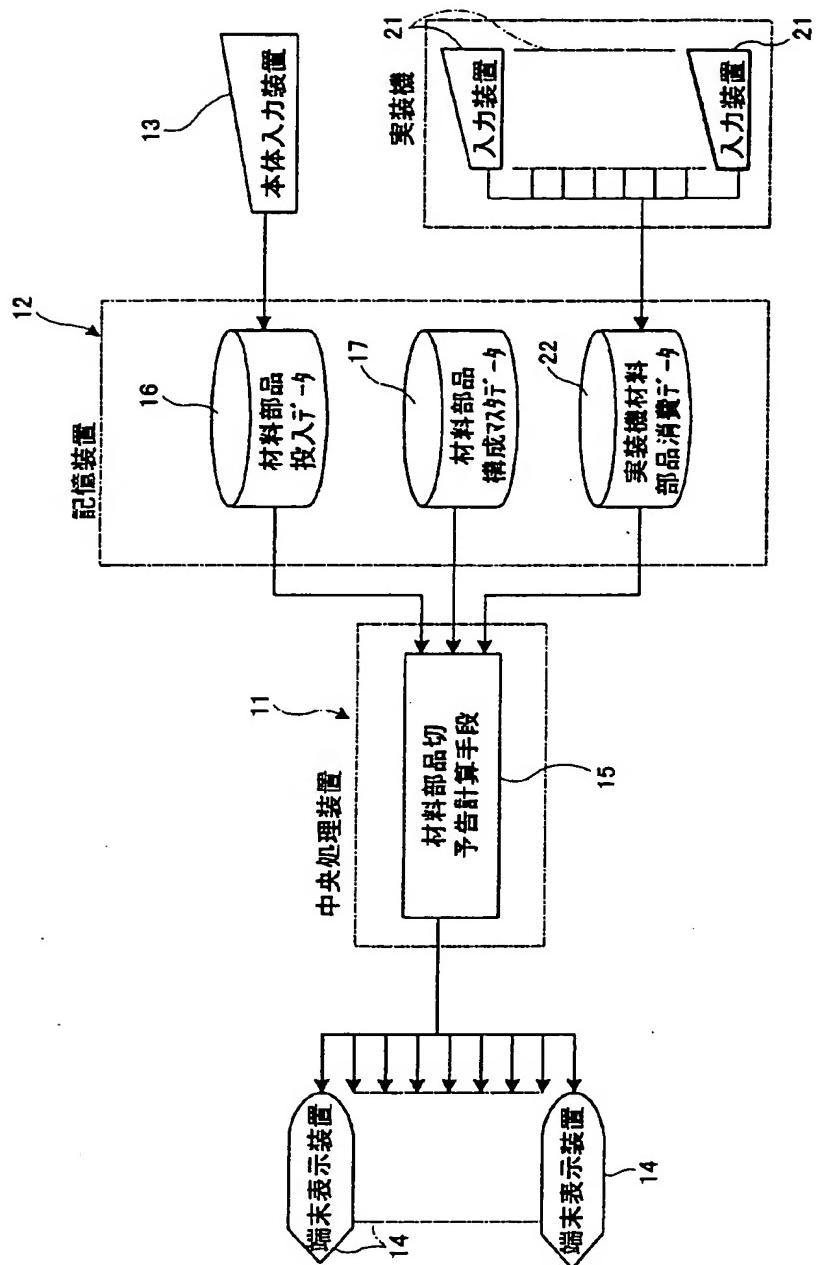
- 1 1 中央処理装置
- 1 2 記憶装置
- 1 3 本体入力装置
- 1 4 端末表示装置
- 1 5 材料部品切予告計算手段
- 1 6 材料部品投入データ
- 1 7 材料部品構成マスタデータ
- 2 1 実装機入力装置
- 2 2 実装機材料部品消費データ
- 3 1 材料部品在庫データ
- 3 2 材料部品倉庫
- 3 3 倉庫表示装置
- 3 4 材料部品要求手段

10

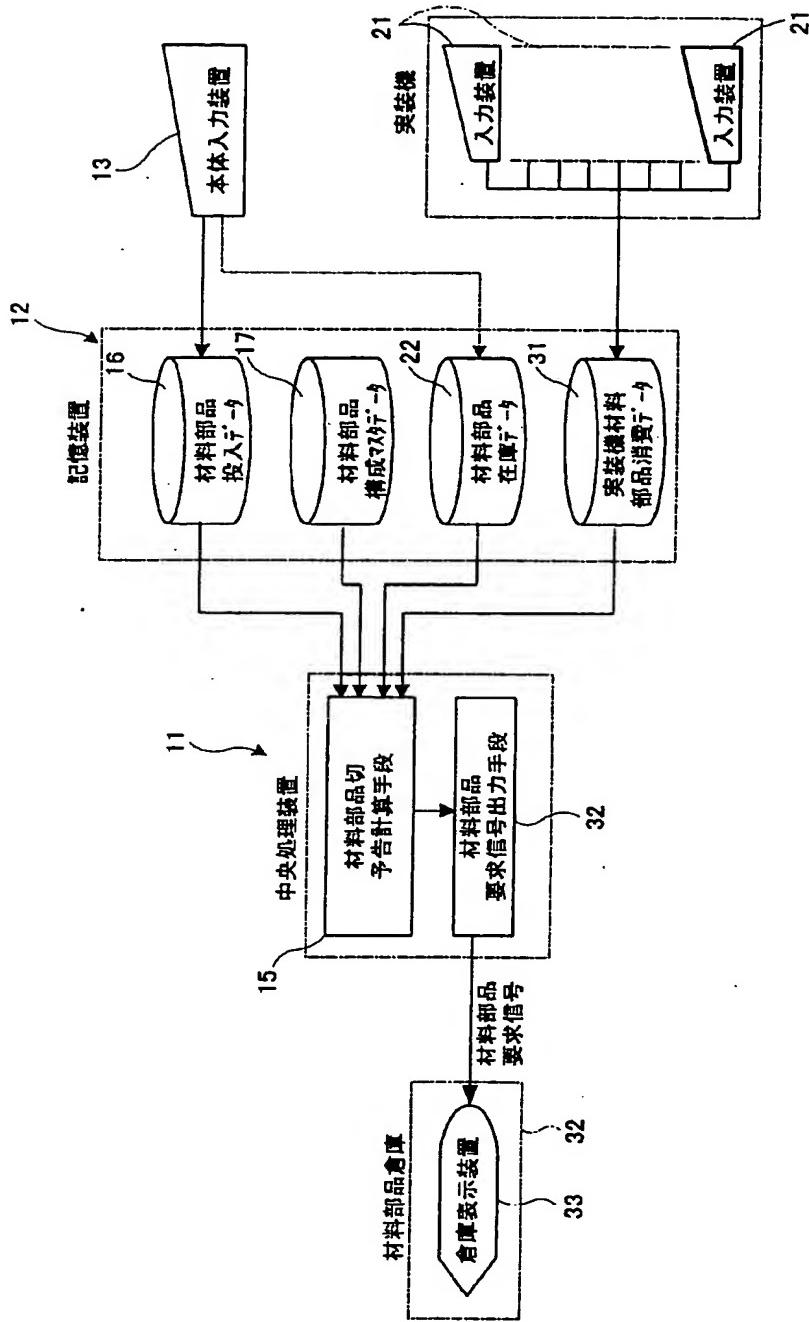
【図3】



【図1】



【図2】



# PATENT ABSTRACTS OF JAPAN

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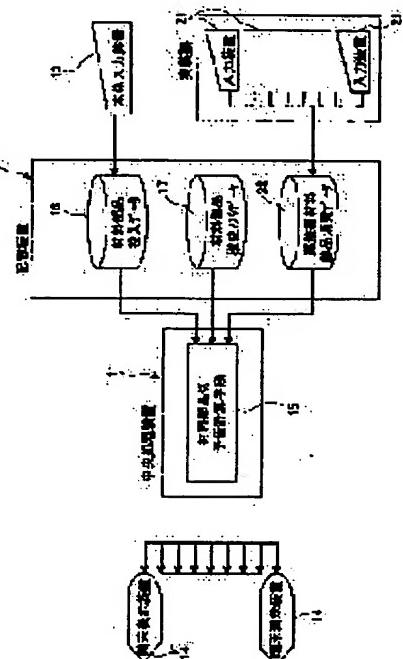
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(22)Date of filing : 27.11.2000

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**(54) METHOD AND APPARATUS FOR ASSISTING MATERIAL PART SUPPLY IN MOUNTING PROCESS**
**(57)Abstract:**

**PROBLEM TO BE SOLVED:** To improve the work efficiency of an operator.  
**SOLUTION:** A material-part stockout warning time calculating means 15 calculates a material-part stockout time by which all material-parts are used up after a material-part delivery start time, based on an attached-axis-specific material-part delivery data 16 for a mounter, a material-part constitution master data 17 in which kind and quantity of parts constituting a product is recorded, and a material-part consumption data 22 for the mounter when a mounter operator is informed on a refill/replacement time for the material part in a mounting process. The material-part stockout warning information comprising the material-part stockout time is displayed on a terminal display 14 possessed by the mounter operator.


**LEGAL STATUS**

[Date of request for examination]

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[Date of final disposal for application]

[Patent number]

[Date of registration]

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[Date of requesting appeal against examiner's decision of rejection]

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CLAIMS

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## [Claim(s)]

[Claim 1] It faces connecting the supplement exchange stage of ingredient components to a mounting machine operator at a mounting process. The ingredient bill-of-materials master data which recorded the ingredient components class and quantity which constitute the ingredient components injection data according to wearing shaft to a mounting machine, and a product. And based on the ingredient components consumption data in a mounting machine, ingredient components OFF time of day until these ingredient components are consumed from ingredient injection start time is computed. The ingredient components supply exchange approach in the mounting process characterized by notifying a mounting machine operator of the ingredient components OFF preliminary announcement information containing this ingredient components OFF time of day.

[Claim 2] The notice of ingredient components OFF preliminary announcement information is the ingredient components supply exchange approach in the mounting process according to claim 1 characterized by what priority is attached to ingredient components OFF preliminary announcement information, and is displayed on a display.

[Claim 3] The ingredient components supply exchange approach in the mounting process according to claim 1 or 2 characterized by displaying the notice of ingredient components OFF preliminary announcement information on the display means of the personal digital assistant device which a mounting machine operator possesses.

[Claim 4] At a mounting process, the supply of ingredient components which carries out an ingredient components piece is faced requiring of ingredient supply origin. The ingredient bill-of-materials master data which recorded the ingredient components class and quantity which constitute the ingredient components injection data according to wearing shaft to a mounting machine, and a product. It is based on the ingredient components consumption data and ingredient components inventory data in a mounting machine. The ingredient components supply exchange approach in the mounting process characterized by computing ingredient components OFF time of day until these ingredients are consumed from ingredient injection start time, and carrying out outbound advice of the required ingredient components to predetermined timing.

[Claim 5] It is ingredient components supply exchange equipment in the mounting process which notifies a mounting machine operator of the supplement exchange stage of ingredient components at a mounting process. An input means to input the ingredient bill-of-materials master data which recorded the ingredient components class and quantity which constitute the ingredient components supply data classified by wearing shaft and the product to a mounting machine, and the ingredient components consumption data in a mounting machine. The storage which memorizes said number data of ingredient components supplies, ingredient bill-of-materials master data, and ingredient components consumption data. The central processing unit which has an ingredient components OFF preliminary announcement count means to compute ingredient components OFF time of day until these ingredients are consumed from ingredient injection start time based on said number data of ingredient components supplies, ingredient bill-of-materials master data, and ingredient components consumption data is provided. Ingredient components supply exchange equipment in the mounting process characterized by forming a display means to display the ingredient components OFF preliminary announcement information containing ingredient components OFF time of day in the terminal equipment which a mounting machine operator possesses.

[Claim 6] It is ingredient components supply exchange equipment in the mounting process which requires the supply of ingredient components which carries out an ingredient components piece of ingredient supply origin at a mounting process. An input means to input the number data of ingredient components supplies according to wearing shaft, ingredient bill-of-materials master data, the ingredient components consumption data in a mounting machine, and ingredient components inventory data. The storage which memorizes said number data of ingredient components supplies, ingredient bill-of-materials master data, ingredient components consumption data, and ingredient components inventory data. It is based on said number data of ingredient components supplies, ingredient bill-of-materials master data, ingredient components consumption data, and ingredient components inventory data. The central processing unit which has an ingredient components OFF preliminary announcement count means to compute ingredient components OFF time of day until these ingredient components are consumed from ingredient injection start time is provided. Ingredient components supply exchange equipment in the mounting process characterized by establishing the ingredient components demand signal output means which carries out outbound advice of the required ingredient components to said central-process means to predetermined timing at ingredient supply origin based on ingredient components OFF time of day.

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[Translation done.]

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

#### [0001]

[Field of the Invention] This invention relates to the ingredient components supply exchange approach and equipment in a mounting process for raising an operator's working efficiency in the mounting process in a manufacture by warning in advance or requiring the ingredient components and ingredient which carry out ingredient components OFF of exchange of ingredient components required for production, and an ingredient, or the supplementary timing of a supplying agency.

#### [0002]

[Description of the Prior Art] In recent years, in each production process of a manufacture, the need of producing by efficient operation of 24 hours is still higher. At the mounting process which is a fountainhead process especially, in order that an operator might reduce the facility stop times for the ingredient components supply by the ingredient components piece, continuous monitoring organization was by force.

[0003] As conventional ingredient components OFF preliminary announcement equipment is shown in drawing 3, the data of the number of initial injections of the ingredient components to a mounting machine It memorizes as ingredient components injection data 6 registered independently. it once inputs into a store 2 from the body input unit 3 — having — the number of injections — a wearing shaft (it is called the Z-axis) — Moreover, the data of the ingredient components class which constitutes a product, and quantity are also inputted into a store 2 from the body input device 3, and are memorized as ingredient bill-of-materials master data 7. Moreover, in a central processing unit 1, an ingredient components OFF preliminary announcement count means 5 to compute ingredient components OFF preliminary announcement time amount based on the ingredient components injection data 6 and the ingredient bill-of-materials master data 7 is established, and the information on this ingredient components OFF preliminary announcement time amount is displayed on a display 4.

[0004] Moreover, at a mounting process, in order to abolish generating with insufficient reduction and ingredient components, the facility stop time for ingredient components being insufficient the ingredient of the part of the number of insurance ingredients (superfluous ingredient for avoiding a material shortage) which computes the quantity of need ingredient components based on the number of production planning, and foresees the number of ingredients and insurance required for production — supplying — \*\*\*\* — a mounting process site — the need — the location for a stock which can keep enough ingredient components needed to be prepared.

[0005] Moreover, there was no system for requiring supply of an ingredient of an ingredient components warehouse in advance in the above-mentioned conventional technique to the ingredient components which an ingredient components piece is likely to generate.

#### [0006]

[Problem(s) to be Solved by the Invention] However, after the above-mentioned ingredient components OFF preliminary announcement count means 5 calculated ingredient components OFF preliminary announcement time amount once in the initial injection time of the ingredient components to a mounting machine at the beginning from the number in injection quantity and ingredient bill-of-materials data, the result is only displayed on a display 4, and the consumption or consumption time amount of each ingredient component in a mounting machine were not taken into consideration by delay and progress of production.

[0007] For this reason, the ingredient components OFF preliminary announcement time amount calculated at the beginning and the time amount which the ingredient components piece of actual ingredient components generates are with error in fact, and it was used only for standard extent to the last in actual employment.

[0008] Moreover, although the ingredient components OFF preliminary announcement time amount for every one mounting opportunity was calculated, when it saw from a viewpoint called mounting machine Rhine which consists of two or more mounting machines, immediately, it did not turn out that ingredient components OFF occurs in an order from which mounting machine, but the operator had judged it based on the information on the ingredient components OFF preliminary announcement time amount according to mounting opportunity, and it had become an operator's activity burden.

[0009] Furthermore, since the display 4 which displays the result of an ingredient components OFF preliminary announcement was restricted to one set of CRT connected to the central processing unit 1 and was installed in the location near a central processing unit 1, if the operator who needs information did not go to the installation of CRT, he could not obtain information, but had caused decline in working efficiency.

[0010] This invention solves the above-mentioned conventional trouble, an operator can be provided with the exact ingredient components OFF preliminary announcement information that the delay of production and progress were made to reflect in ingredient components OFF preliminary announcement time amount, on real time, and it aims at offering the ingredient components supply exchange approach and equipment in the mounting process which can aim at improvement in an operator's working efficiency.

[0011] Moreover, exact ingredient components leaving the garage can be required, and while preventing the lack of ingredient components, it aims at offering the ingredient components supply exchange approach and equipment in the mounting process

which can control an ingredient components inventory.

[0012]

[Means for Solving the Problem] In order to attain this purpose invention according to claim 1 It faces connecting the supplement exchange stage of ingredient components to a mounting machine operator at a mounting process. The ingredient bill-of-materials master data which recorded the ingredient components class and quantity which constitute the ingredient components injection data according to wearing shaft to a mounting machine, and a product, And based on the ingredient components consumption data in a mounting machine, ingredient components OFF time of day until these ingredient components are consumed from ingredient injection start time is computed, and a mounting machine operator is notified of the ingredient components OFF preliminary announcement information containing this ingredient components OFF time of day.

[0013] According to the above-mentioned configuration, from ingredient components injection data, ingredient bill-of-materials master data, and ingredient components consumption data, the ingredient components OFF time of day whether an ingredient components piece is behind generated from this time is calculated, and the ingredient components OFF preliminary announcement information containing this ingredient components OFF time of day is sent and displayed on a display. The newest information on a mounting machine is acquired and this ingredient components consumption data is used. Moreover, an ingredient components OFF preliminary announcement time amount count means The input contained in ingredient components injection data, and the number of the ingredient bill of materials included in ingredient bill-of-materials master data, Since the ingredient components OFF time amount according to Z-axis from this time is computed by multiplying by the ingredient consumption from a mounting machine, and considering the production process of a mounting machine An operator can be provided with the exact ingredient components OFF preliminary announcement information that the delay of production and progress were made to reflect in ingredient components OFF preliminary announcement time amount, on real time, and improvement in an operator's working efficiency can be aimed at.

[0014] Moreover, invention according to claim 5 is ingredient components supply exchange equipment in the mounting process which notifies a mounting machine operator of the supplement exchange stage of ingredient components at a mounting process. An input means to input the ingredient bill-of-materials master data which recorded the ingredient components class and quantity which constitute the ingredient components supply data classified by wearing shaft and the product to a mounting machine, and the ingredient components consumption data in a mounting machine, The storage which memorizes said number data of ingredient components supplies, ingredient bill-of-materials master data, and ingredient components consumption data, The central processing unit which has an ingredient components OFF preliminary announcement count means to compute ingredient components OFF time of day until these ingredients are consumed from ingredient injection start time based on said number data of ingredient components supplies, ingredient bill-of-materials master data, and ingredient components consumption data is provided. A display means to display the ingredient components OFF preliminary announcement information based on ingredient components OFF time of day is formed in the terminal equipment which a mounting machine operator possesses.

[0015] According to the above-mentioned configuration, the ingredient components OFF time of day whether an ingredient components piece is behind generated from this time is calculated by the ingredient components OFF preliminary announcement count means of a central processing unit from ingredient components injection data, ingredient bill-of-materials master data, and ingredient components consumption data, and the ingredient components OFF preliminary announcement information based on ingredient components OFF time of day is displayed on the display means of the terminal equipment which an operator possesses. The ingredient components consumption data of the ingredient components according to wearing shaft of the mounting inside of a plane in here The newest information is acquired and used for the central processing unit from the mounting machine input means. With an ingredient components OFF preliminary announcement time amount count means Since the ingredient components OFF time amount according to wearing shaft from this time is computed by multiplying by the ingredient consumption from the input contained in ingredient components injection data, the number of the ingredient bill of materials included in ingredient bill-of-materials master data, and a mounting machine, and considering the production process of a mounting machine An operator can be provided with the exact ingredient components OFF preliminary announcement information that the delay of production and progress were made to reflect in ingredient components OFF preliminary announcement time amount, on real time, and improvement in an operator's working efficiency can be aimed at. Moreover, even if even a display does not go out like before, with the display means of a terminal equipment at hand, an operator can obtain exact ingredient components OFF preliminary announcement information on real time, and can raise working efficiency more. An operator can be wide opened from the continuous monitoring of a facility by offer of this newest ingredient components OFF preliminary announcement time amount, it can be engaged in \*\*, such as a total of the operation daily report which is incidental business, and mitigation of an operator's activity burden and improvement in working efficiency can be aimed at.

[0016] In an approach according to claim 1, invention according to claim 2 attaches priority to ingredient components OFF preliminary announcement information, and displays the notice of ingredient components OFF preliminary announcement information on a display.

[0017] By displaying the priority over which priority is given to an activity, for example, the sequence which ingredient components OFF generates, on a display according to the above-mentioned configuration, an operator The required mounting machine and ingredient components of an activity can be immediately judged from this ingredient components OFF preliminary announcement information. Since an operator can perform prior ingredient preparation and supply according to the newest ingredient components OFF preliminary announcement time amount and reduction of the facility stop times by the ingredient components piece and ingredient supply can be aimed at, an operator's activity burden can be mitigated and improvement in working efficiency can be aimed at.

[0018] Invention according to claim 3 is displayed on a display means of a personal digital assistant device by which a mounting machine operator possesses the notice of ingredient components OFF preliminary announcement information, in an approach given in either of claims 1 or 2.

[0019] According to the above-mentioned configuration, even if even a display does not go out like before, with the display of a

gestalt terminal equipment at hand, an operator can obtain exact ingredient components OFF preliminary announcement information on real time, and can raise working efficiency more. An operator can be wide opened from the continuous monitoring of a facility by offer of this newest ingredient components OFF preliminary announcement time amount, it can be engaged in \*\*, such as a total of the operation daily report which is incidental business, and mitigation of an operator's activity burden and improvement in working efficiency can be aimed at.

[0020] The supply of ingredient components which invention according to claim 4 is a mounting process, and carries out an ingredient components piece is faced requiring of ingredient supply origin. The ingredient bill-of-materials master data which recorded the ingredient components class and quantity which constitute the ingredient components injection data according to wearing shaft to a mounting machine, and a product, Based on the ingredient components consumption data and ingredient components inventory data in a mounting machine, ingredient components OFF time of day until these ingredients are consumed from ingredient injection start time is computed, and outbound advice of the required ingredient components is carried out to predetermined timing.

[0021] According to the above-mentioned configuration, from ingredient components injection data, ingredient bill-of-materials master data, ingredient components inventory data, and the ingredient components consumption data according to wearing shaft of a mounting machine, it is calculated whether an ingredient components piece is behind generated from this time, and it directs a demand for supply of ingredient components to ingredient components supply origin. The ingredient components consumption data according to wearing shaft of a mounting machine acquire the newest information from a mounting machine, and are used. In ingredient components OFF preliminary announcement time amount count Since the ingredient components OFF time amount according to wearing shaft from this time is computed by considering the production process of a mounting machine from ingredient components injection data, according to the newest ingredient components OFF preliminary announcement information, ingredient components can supply before ingredient components OFF from ingredient components supply origin, and generating with insufficient ingredient components does not take place. Moreover, right \*\*\*\*\* can perform initial ingredient supply at a mounting process in supply of only the minimum number of ingredient components required for the number of production, inventories of superfluous ingredient components can be reduced, and a cost cut can be realized.

[0022] Invention according to claim 6 is a mounting process, and it is ingredient components supply exchange equipment in the mounting process which requires the supply of ingredient components which carries out an ingredient components piece of ingredient supply origin. An input means to input the number data of ingredient components supplies according to wearing shaft, ingredient bill-of-materials master data, the ingredient components consumption data in a mounting machine, and ingredient components inventory data, The storage which memorizes said number data of ingredient components supplies, ingredient bill-of-materials master data, ingredient components consumption data, and ingredient components inventory data, It is based on said number data of ingredient components supplies, ingredient bill-of-materials master data, ingredient components consumption data, and ingredient components inventory data. The central processing unit which has an ingredient components OFF preliminary announcement count means to compute ingredient components OFF time of day until these ingredient components are consumed from ingredient injection start time is provided. The ingredient components demand signal output means which carries out outbound advice of the required ingredient components to said central-process means to predetermined timing at ingredient supply origin based on ingredient components OFF time of day is established.

[0023] According to the above-mentioned configuration, it is based on the ingredient components injection data, ingredient bill-of-materials master data and ingredient components inventory data which were inputted from the input means, and ingredient components consumption data. With the ingredient components OFF preliminary announcement count means of a central processing unit The ingredient components OFF time of day of whether an ingredient components piece is behind generated from this time is calculated. Since the demand signal of need ingredient components is outputted to ingredient components supply origin from an ingredient components demand signal output means and ingredient components warehousing is directed based on this ingredient components OFF time of day Since an exact class and the ingredient components of quantity are stocked from ingredient supply origin even in an ingredient components piece according to the newest ingredient components OFF preliminary announcement time amount, a production halt by generating with insufficient ingredient components does not take place. Moreover, since only the minimum number of ingredient components required for the number of production is good, initial ingredient supply at a mounting process can aim at reduction of overstock, and can realize a cost cut.

[0024]

[Embodiment of the Invention] The gestalt of operation of the ingredient components OFF preliminary announcement equipment which is ingredient components supply exchange equipment applied to this invention below is explained with reference to 1.

[0025] The body input unit 13 for this ingredient components OFF preliminary announcement equipment to input the injection information on the ingredient components to a mounting machine (input means), The mounting machine input unit 21 for inputting the consumption information on ingredient components from a mounting machine (input means), The storage 12 for memorizing the ingredient components injection data 16, the ingredient bill-of-materials master data 17, and the charge components consumption data 22 of mounting equipments, The central processing unit 11 which has an ingredient components OFF preliminary announcement time amount count means 15 to compute ingredient components OFF preliminary announcement time of day from said each data, The terminal display (display means) 14 which displays the ingredient components OFF preliminary announcement data which are prepared in the personal digital assistant device which the operator of a mounting machine possesses, and contain ingredient components OFF preliminary announcement time of day is provided.

[0026] Actuation of the above-mentioned ingredient components OFF preliminary announcement equipment is explained. First, the ingredient components injection data 16 based on the data with which the injection information on the ingredient components to a mounting machine was displayed on the ingredient information label of attachment on ingredient components from the body input device 13 are inputted and registered into storage 12. Information comes to hand with the information on the ingredient information label of this ingredient components attachment checking a bar code given in a label, and ingredient components injection time, product lot number information required for preliminary announcement count, an injection place

facility, Z-axis (wearing shaft) No. injection quantity, quantity, etc. are contained in this ingredient components injection data 16. [0027] Moreover, the newest ingredient components consumption is inputted into a store 12 from the mounting machine input unit 21, and it is registered as charge components consumption data 22 of mounting equipments. And with the ingredient components OFF preliminary announcement count means 5, ingredient components OFF preliminary announcement time of day is computed based on the ingredient components injection data 16, the ingredient bill-of-materials master data 17, and the charge components consumption data 22 of mounting equipments. And the ingredient components OFF preliminary announcement information containing this ingredient components OFF preliminary announcement time of day is displayed on that terminal display 14 outputted to the personal digital assistant device which a mounting machine operator possesses.

[0028] With the ingredient components OFF preliminary announcement count means 15, with the ingredient components input according to Z-axis first contained in the ingredient components injection data 6, and the number of the ingredient bill of materials included in the ingredient bill-of-materials master data 17, it multiplies by the charge components consumption data of mounting equipments, subsequently the production process (production baton) of a mounting machine is considered, and this computes the ingredient components OFF preliminary announcement time of day according to Z-axis in all mounting machines from this time. And the ingredient components OFF preliminary announcement data containing the ingredient components OFF preliminary announcement time of day according to Z-axis of each mounting machine By the priority which an operator needs for an ingredient components supplement activity, for example, rearrange simply in order of ingredient components OFF preliminary announcement time of day. It is processed so that an instant judgment of in an order from which Z-axis of which mounting machine an operator glances and an ingredient components piece is generated may be made, and a direct output is carried out to an operator's personal digital assistant device, and ingredient components OFF preliminary announcement information is displayed on the terminal display 14.

[0029] According to the gestalt of the above-mentioned implementation, output the newest ingredient components consumption of each mounting machine to a store 12 from the mounting machine input device 21, and it is made to memorize as charge components consumption data 22 of mounting equipments on real time. With the ingredient bill-of-materials master data 17 beforehand remembered to be the ingredient components injection data 16 inputted from the body input device 12 Since ingredient components OFF preliminary announcement time of day is computed by data processing being carried out with the ingredient components OFF preliminary announcement count means 15 The ingredient components OFF information according to Z-axis from this time can be expressed to the terminal display 14 as real time, an operator can be provided with the exact ingredient components OFF preliminary announcement information that the delay of production and progress were made to reflect in ingredient components OFF preliminary announcement time amount, and improvement in an operator's working efficiency can be aimed at.

[0030] Moreover, since it is displayed on the terminal display 14 the ingredient components of which Z-axis of which mounting machine the ingredient components OFF preliminary announcement information of is lost in accordance with the priority of the order of time of day used as ingredient components OFF, an operator can judge the mounting machine and the Z-axis which serve as required ingredient components of an ingredient components supplement, and components starved feeding from this ingredient components OFF preliminary announcement information immediately. Therefore, according to the newest ingredient components OFF preliminary announcement information, an operator can perform prior ingredient preparation and supply, can aim at reduction of the facility stop times by the ingredient components piece and ingredient supply, can mitigate an operator's activity burden, and can aim at improvement in working efficiency.

[0031] Since ingredient components OFF preliminary announcement information is furthermore displayed on the terminal display 14 of the personal digital assistant device which a mounting machine operator possesses, even if even a display does not go out like before, an operator is a gestalt terminal equipment at hand, can obtain exact ingredient components OFF preliminary announcement information on real time, and can raise working efficiency more. An operator can be wide opened from the continuous monitoring of a facility by offer of this newest ingredient components OFF preliminary announcement time amount, it can be engaged in \*\*, such as a total of the operation daily report which is incidental business, and mitigation of an operator's activity burden and improvement in working efficiency can be aimed at.

[0032] Next, the gestalt of operation of the ingredient supply demand equipment which is ingredient components supply exchange equipment concerning this invention is explained with reference to drawing 2. In addition, the same sign is given to the same member as starved feeding preliminary announcement equipment, and explanation is omitted.

[0033] The ingredient components inventory data 31 in which the amount of storage of each ingredient component kept by the ingredient components storage section of mounting machine Rhine other than the ingredient components injection data 16, the ingredient bill-of-materials master data 17, and the charge components consumption data 22 of mounting equipments is shown are memorized by the store 12, and this ingredient components inventory data 31 is inputted into it from the body input unit 12 or other input units.

[0034] Moreover, if it is prepared although an ingredient demand signal is outputted to a central processing unit 11 based on the ingredient components OFF preliminary announcement time of day calculated with the ingredient components OFF preliminary announcement count means 15, and it comes before the set-up predetermined time The ingredient demand signal which requires the class and quantity of the ingredient components which carry out an ingredient components piece to the information machines and equipment of the ingredient components warehouse 32 which is ingredient components supply origin from the ingredient components demand means 34 is outputted, and ingredient components demand information is displayed on the warehouse display (display means) 33 of the ingredient components warehouse 32.

[0035] In the above-mentioned ingredient components OFF preliminary announcement equipment, first, the injection information on the ingredient components to a mounting machine is inputted based on the ingredient information label of ingredient components attachment from an input device 3, and is registered into a store 12 as ingredient components injection data 16. Moreover, while the ingredient bill-of-materials master data 17 is beforehand inputted with the recording apparatus 12 at this time, the ingredient components inventory data 31 in which the amount of storage of each ingredient component kept by the ingredient components storage section of this mounting machine Rhine is shown are inputted and kept. Furthermore, the newest

ingredient components consumption information is inputted into a store 12 from the mounting machine input unit 21, and it is registered as charge components consumption data 22 of mounting equipments.

[0036] Subsequently, based on the ingredient components injection data 16, the ingredient bill-of-materials master data 17, the ingredient components inventory data 31, and the charge components consumption data 21 of mounting equipments, ingredient components OFF preliminary announcement time of day is computed by the ingredient components OFF preliminary announcement count means 15 of a central processing unit 11. And if predetermined time of day comes, an ingredient demand signal will be outputted to the information machines and equipment of the ingredient components warehouse 32 from the ingredient components demand means 34, and the ingredient components demand information on required ingredient components will be displayed on the display 33 of the ingredient components warehouse 32. Thereby, the target ingredient components are carried in to mounting machine Rhine from the ingredient components warehouse 32 to the optimal timing.

[0037] According to the gestalt of the above-mentioned implementation, it adds to the ingredient components injection data 16 and the ingredient bill-of-materials master data 17 which were inputted from the body input device 12. The ingredient components inventory data 31, From the ingredient components consumption data 31 according to wearing shaft in the mounting machine inputted on real time from the mounting machine input device, with the ingredient components OFF preliminary announcement count means 15 of a central processing unit 11 Since the ingredient components OFF time of day of whether an ingredient components piece is behind generated from this time is calculated and an ingredient components demand signal is outputted to the ingredient components warehouse 32 from an ingredient components demand signal output means based on this ingredient components OFF time of day the newest ingredient components OFF preliminary announcement time amount Maeno — since the ingredient components of the exact class of ingredient components or quantity to need are stocked from the ingredient components warehouse 32 to mounting machine Rhine to proper timing, a production halt by generating with insufficient ingredient components does not take place. Moreover, only the minimum number of ingredient components required for the number of production of initial ingredient components supply at a mounting process is good, and since the optimal quantity according to a production rate is carried in, the number of ingredient components added on the way can also aim at reduction of overstock, and can realize a cost cut.

[0038]

[Effect of the Invention] As mentioned above, according to this invention according to claim 1, from ingredient components injection data, ingredient bill-of-materials master data, and ingredient components consumption data, the ingredient components OFF time of day whether an ingredient components piece is behind generated from this time is calculated, and the ingredient components OFF preliminary announcement information containing this ingredient components OFF time of day is sent and displayed on a display. The newest information on a mounting machine is acquired and this ingredient components consumption data is used. Moreover, an ingredient components OFF preliminary announcement time amount count means The input contained in ingredient components injection data, and the number of the ingredient bill of materials included in ingredient bill-of-materials master data. Since the ingredient components OFF time amount according to Z-axis from this time is computed by multiplying by the ingredient consumption from a mounting machine, and considering the production process of a mounting machine An operator can be provided with the exact ingredient components OFF preliminary announcement information that the delay of production and progress were made to reflect in ingredient components OFF preliminary announcement time amount, on real time, and improvement in an operator's working efficiency can be aimed at.

[0039] Moreover, according to invention according to claim 5, the ingredient components OFF time of day whether an ingredient components piece is behind generated from this time is calculated by the ingredient components OFF preliminary announcement count means of a central processing unit from ingredient components injection data, ingredient bill-of-materials master data, and ingredient components consumption data, and the ingredient components OFF preliminary announcement information based on ingredient components OFF time of day is displayed on the display means of the terminal equipment which an operator possesses. The ingredient components consumption data of the ingredient components according to wearing shaft of the mounting inside of a plane in here The newest information is acquired and used for the central processing unit from the mounting machine input means. With an ingredient components OFF preliminary announcement time amount count means Since the ingredient components OFF time amount according to wearing shaft from this time is computed by multiplying by the ingredient consumption from the input contained in ingredient components injection data, the number of the ingredient bill of materials included in ingredient bill-of-materials master data, and a mounting machine, and considering the production process of a mounting machine An operator can be provided with the exact ingredient components OFF preliminary announcement information that the delay of production and progress were made to reflect in ingredient components OFF preliminary announcement time amount, on real time, and improvement in an operator's working efficiency can be aimed at. Moreover, even if even a display does not go out like before, with the display means of a terminal equipment at hand, an operator can obtain exact ingredient components OFF preliminary announcement information on real time, and can raise working efficiency more. An operator can be wide opened from the continuous monitoring of a facility by offer of this newest ingredient components OFF preliminary announcement time amount, it can be engaged in \*\*, such as a total of the operation daily report which is incidental business, and mitigation of an operator's activity burden and improvement in working efficiency can be aimed at.

[0040] By displaying the priority over which priority is given to an activity, for example, the sequence which ingredient components OFF generates, on a display according to invention according to claim 2, an operator The required mounting machine and ingredient components of an activity can be immediately judged from this ingredient components OFF preliminary announcement information. Since an operator can perform prior ingredient preparation and supply according to the newest ingredient components OFF preliminary announcement time amount and reduction of the facility stop times by the ingredient components piece and ingredient supply can be aimed at, an operator's activity burden can be mitigated and improvement in working efficiency can be aimed at.

[0041] According to invention according to claim 3, even if even a display does not go out like before, with the display of a gestalt terminal equipment at hand, an operator can obtain exact ingredient components OFF preliminary announcement information on real time, and can raise working efficiency more. An operator can be wide opened from the continuous monitoring

of a facility by offer of this newest ingredient components OFF preliminary announcement time amount, it can be engaged in \*\*, such as a total of the operation daily report which is incidental business, and mitigation of an operator's activity burden and improvement in working efficiency can be aimed at.

[0042] According to invention according to claim 4, from ingredient components injection data, ingredient bill-of-materials master data, ingredient components inventory data, and the ingredient components consumption data according to wearing shaft of a mounting machine, it is calculated whether an ingredient components piece is behind generated from this time, and it directs a demand for supply of ingredient components to ingredient components supply origin. The ingredient components consumption data according to wearing shaft of a mounting machine acquire the newest information from a mounting machine, and are used. In ingredient components OFF preliminary announcement time amount count Since the ingredient components OFF time amount according to wearing shaft from this time is computed by considering the production process of a mounting machine from ingredient components injection data, according to the newest ingredient components OFF preliminary announcement information, ingredient components can supply before ingredient components OFF from ingredient components supply origin, and generating with insufficient ingredient components does not take place. Moreover, right \*\*\*\*\* can perform initial ingredient supply at a mounting process in supply of only the minimum number of ingredient components required for the number of production, inventories of superfluous ingredient components can be reduced, and a cost cut can be realized.

[0043] According to invention according to claim 6, it is based on the ingredient components injection data, ingredient bill-of-materials master data and ingredient components inventory data which were inputted from the input means, and ingredient components consumption data. With the ingredient components OFF preliminary announcement count means of a central processing unit The ingredient components OFF time of day of whether an ingredient components piece is behind generated from this time is calculated. Since the demand signal of need ingredient components is outputted to ingredient components supply origin from an ingredient components demand signal output means and ingredient components warehousing is directed based on this ingredient components OFF time of day Since an exact class and the ingredient components of quantity are stocked from ingredient supply origin even in an ingredient components piece according to the newest ingredient components OFF preliminary announcement time amount, a production halt by generating with insufficient ingredient components does not take place. Moreover, since only the minimum number of ingredient components required for the number of production is good, initial ingredient supply at a mounting process can aim at reduction of overstock, and can realize a cost cut.

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[Translation done.]

## \* NOTICES \*

JPO and NCIPPI are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the gestalt of operation of the ingredient components OFF preliminary announcement equipment concerning this invention.

[Drawing 2] It is the block diagram showing the gestalt of operation of the ingredient components demand equipment concerning this invention.

[Drawing 3] It is the block diagram showing conventional ingredient components OFF preliminary announcement equipment.

[Description of Notations]

11 Central Processing Unit

12 Storage

13 Body Input Unit

14 Terminal Display

15 Ingredient Components OFF Preliminary Announcement Count Means

16 Ingredient Components Injection Data

17 Ingredient Bill-of-Materials Master Data

21 Mounting Machine Input Unit

22 Charge Components Consumption Data of Mounting Equipments

31 Ingredient Components Inventory Data

32 Ingredient Components Warehouse

33 Warehouse Display

34 Ingredient Components Demand Means

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[Translation done.]